

# Bias Invariant Robust Estimation for Data Reconciliation of Nonlinear Dynamic Systems

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April 27, 2020

## Abstract

A few specific scenarios applied in examples of only five works suggest that the solely use of robust estimators for nonlinear dynamic data reconciliation is able to cope with biased measurements. We present a counterexample to that belief on a dynamic model of two CSTRs that gives rise to wrong transient behaviour. Motivated by this, we introduce and examine an invariant approach to measurement bias. It is based on the location invariance assured by a robust measure of scale used when detecting a sequence of consecutive differences between measured and reconciled values of the same sign. When applied to the counterexample, it can be seen that the procedure has the correct behaviour and shows good results.

## Hosted file

nddr-with-bias-and-outliers-review.pdf available at <https://authorea.com/users/315932/articles/446171-bias-invariant-robust-estimation-for-data-reconciliation-of-nonlinear-dynamic-systems>